Work Order I <i>July-13-12 12:36:53</i>				*873	326*						Page 1	
Revision ID:	2-664-101F			Accept	*N900	040	100)* s	etup Sta	171	S1*	
100111 1 10011101	stube Fwd									, ,IM	S2*	
Start Date: 7/20			*1*		Cust Item I	D:						
Required Date: 7/27 Reference:	/12 Req'd Q	ty: 1.00	*1*		Customer:			•				
Approvals: Pro	ocess Plan:	<u> </u>	ate:12/07//	&Tooling:	Da	ate:	_	, R	un Sta	1/1	R1*	
QC			ate:	SPC (Y/N):	Da	ate:			Sto	*N	R2*	
Sequence ID/ Work Center ID	Operation Description			Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp	
Draw Nbr	Revision Nbr		\		۸							_
D212-664-141	Rev D (DEO)				/					· ·		
*100 *100* DC Document Control	DOCUMEN	NT CONTROL Memo Photocopy bluefil	e and create abels as	0.00 0.00 Per PPP D212-664-101	57 210370 EHG005		·.			· . ———	. <u> </u>	
110	Pick Kit Packaging			0.00	el Wo	128						
110 Packaging	2 2	Memo	\	0.00	0			×			-	
Packaging												`
120				0.00								
120	BENDING	MACHINE - CRC	SSTUBES									
CNC Bend 2		Memo		0.00								
CNC Alpha 160 Bender		Bend tube as per		sing CNC bender progra	am 212-fw and							

B86228 D212-664-101

NCR:	Yes	/	No

								•	DQA:	Date:	
NCR: Y	es / No				WORK ORDER NON-C	CONF	ORN	MANCE / UPDATE	·		
- : - : 					_	-			QA Closed:	Date:	
Work Orde	r·				DISPOSITION			AGAINST DI	EPARTMENT	PROCESS	
Work Orde	· ·		<u></u>		Rework	7 		Skid-tube Crosstube	7	Water Jet	Engineering
Part N	0.				Scrap			Machining Small Fab	Pro	d. Eng. Coor.	Quality
					Use-as-is] ⊤	herm	noforming Finishing	Rec/Stor	e/Packaging	Other
NCR N	0				Work Order Update]		Large Fab Composite		Supplier	
		,	, ,		<u> </u>				1		1
Root		.] _		ption of work order update	Init		Action	Sign &	Varifiantian	OC Increases
Cause	Date	Step	Qty		or Non-conformance	Chief	Eng	Description	Date	Verification	QC Inspector
Doc/Data	-	İ									
quip/Tooling Operator											
Material	\dashv										
etup	╡										
Other	┪										
Process	7						, `				
Supplier	7										
raining											
Jnapproved		·			·						
					. F	AULT (CATE	GORY			
Landin	g Gear				General	_					_
1	Bending				Bend	G	rain		Ovalized	_	Pressure/Forced
	Centre N	ot Conce	ntric to (o/s	BOM/Route	\vdash	ardwa	}	Over/Under		Temperature/Cure
-	Cracks			<u> </u>	Broken/Damaged	_		on Incomplete	Part Incorre	-	Weld
1	Crushed/	Crimped.	-	<u> </u>	Burrs	-		ions Incomplete/Unclear	Part Lost/M	issing	Wrong Stock Pulled
	Cuffs			<u> </u>	Contamination	\vdash		enance	Part Moved		
].	Heat Trea				Countersink	Mislabeled			Positioned V		
	Inspectio		Tube	L	Cut Too Short	<u> </u>	lisread	<u> </u>	Power Loss/	Surge	Other
	Ripples ir			<u> </u>	Drill Holes		ffset	- W			
	Torque V			` _	Drawing	\vdash		Calibration			
	Turning Sequence Finish					_		Sequence			
	Wave/Tw	vist in Tul	be		Folio	0	utside	Dimensions			

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Orde <i>July-13-12 12:3</i>		7326		*873	326*						Page 2
Item ID: Revision ID: Item Name:	D212-664- Crosstube F			Accept	*N900	040	100)*	Setup Star	I VI	S1* S2*
Required Date: 7/27/12 Req'd Qty: Reference: Approvals: Process Plan:		Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:					
Approvals:		lan:	Date:	Tooling: SPC (Y/N):		nte:			Run Star Sto	" \	R1* R2*
Sequence ID/ Work Center II 130 *130* QC Quality Control		Operation Description QC15- Crosstube Dimen		Set Up/ Run Hours 0.00	Tool ID	Tool #	Plan Code	Accept Qty	Reject Oty	Reject Number	Insp. Stamp
*140 *140 Crosstubes Crosstubes		DT8549,usi 2-Ream hol DT8548 & to ensure ali	ng drill table DT8577, e to finish size in tube DT8549.Check dimens gnment with saddle ho	0.00 wg D212-664-141 using drill set-up towers in hole #7 as per as per Dwg D212-664-14 usions between holes, both side oles.	er QSI 10 ing drill Jig es on both cuffs,	/					

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	MANCE / UPE	DATE	QA Closed:	Dat	:e:	
Work Orde	er:					DISPOSITION				AGAINST DE	PARTMENT	PROCESS		
Part f	•					Rework Scrap Use-as-is Work Order Update		f Therm	Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite	4	Water Jet d. Eng. Coor. e/Packaging Supplier		Engineering Quality Other
Root					Descri	ption of work order update		nitial	Act	ion	Sign &		Т	
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Descr	iption	Date	Verification	<u> </u>	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved							A111	T CATE	GORY					
Landi	ng G	Sear				General	701	- CAIL			•			
	Bending Centre Not Concentric to O/S Cracks Crushed/Crimped Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend Torque Waves in Extrusion				Bend BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes		Instruct Mainte Mislabe Misread Offset	ion Incomplete cions Incomplete/U enance eled	Jnclear	Ovalized Over/Under Part Incorre Part Lost/M Part Moved Positioned V Power Loss/	ct ssing Vrong		Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other	

Out of Sequence

Outside Dimensions

DQA:

Date:

Turning Sequence

Wave/Twist in Tube

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Ord <i>July-13-12 12:3</i>		7326 :		*87:	326*							Page 3
Item ID: Revision ID:	D212-664-1			Accept	*N900	0040	100)*	Setup	Start Stop	*N.	S1*
Item Name:	Crosstube Fw	⁄d								Stop	*N:	S 2*
Start Date:	7/20/12	Start Qty: 1.00	*1*		Cust Item	ID:						
Required Date:	7/27/12	Req'd Qty: 1.00	*1*		Customer:							
Reference:									D	Start		
Approvals:	Process Pl	an:	Date:	Tooling:	D	Date:			Run	Start	*NI	R1 *
	QC:		Date:	SPC (Y/N):	D	Pate:				Stop	*NI	R2*
Sequence ID/ Work Center ID		Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	t Rej Qty		Reject Number	Insp. Stamp
160 QC Quality Control		QC5- Inspect part compl	eteriess to step on w/C	0.00								
170		Outsource process - ND	T per QSI038 4.1	0.00								
170 Outsource2		Мето		0.00								
Outsource process	·NDI	Issue P/O:_ LPI as per A	ASTM 1417 Level 2 of NDT results to wor		,							
180		Receive & Inspect for D	amage & Mat'l Certs	0.00	$\langle \ \ \rangle$							
180		Packaging										
Packaging		Memo		0.00								
Packaging		Ensure copy	y of NDT results attach	ed to work order.								

											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-O	100	NFORM	/ANCE / UP	DATE	·		
	-										QA Closed:	Date:	
Work Orde	or.					DISPOSITION				AGAINST DE	PARTMENT	PROCESS	
Work Oral						Rework	1		Skid-tube	Crosstube		Water Jet	Engineering
Part f	۷o.					Scrap			Machining	Small Fab	Pro	d. Eng. Coor.	Quality
						Use-as-is]	Therm	noforming	Finishing	Rec/Stor	e/Packaging	Other
NCR I	٧o.					Work Order Update]		Large Fab	Composite		Supplier	
Root		1	1		Doscri	ption of work order update	Т	nitial	۸۵	tion	Sign &		
Cause		Date	Step	Qty	· '	or Non-conformance	1	ief Eng		ription	Date	Verification	QC Inspector
Doc/Data		Date	эсср	Qty		or reon comormance	-	iici Eiig	Dese	ription	Bute	Vermedelon	QC IIISPECTOR
Equip/Tooling		1											
Operator		1	-										
Material										`			
Setup													
Other													
Process													
Supplier]											
Training													
Unapproved													
						F	AUL	T CATE	GORY				
Landi	ng (Gear				General	_	•			•	_	•
	Bending					4	L	Grain			Ovalized		Pressure/Forced
	Centre Not Concentric to O/S BOM/Route					-	\perp	Hardwa		<u></u>	Over/Under	⊢	Temperature/Cure
						Broken/Damaged	\vdash	1 '	on Incomplete		Part Incorre	 	Weld
l	Crushed/Crimped					Burrs	1	Instruct	ions Incomplete/	/Unclear	Part Lost/Mi	issing	Wrong Stock Pulled

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Part Moved

Positioned Wrong

Power Loss/Surge

Other

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cuffs

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Ord July-13-12 12:3		326		*873	26*							Page 4	ļ
tem ID: Revision ID: Item Name:	D212-664-10			Accept	*N900	040	100)*	Setup	Start Stop	*N:	S1* S2*	
Start Date: Required Date: Reference:	equired Date: 7/27/12 Req'd Qty: 1.00 eference: oprovals: Process Plan:				Cust Item I Customer:	D:							
Approvals: Process Plan:QC:				Tooling: SPC (Y/N):		ate:]	Run	Start Stop		R1* R2*	
Sequence ID/ Work Center I 190 *100* QC Quality Control	D	Operation Description QC5- Inspect part comp Memo Inspect for c		Set Up/ Run Hours 0 0.00 0.00 ts are as per Dwg D212-664-14	Tool ID	Tool #	Plan Code	Accept Qty	Rej Qty		Reject Number	Insp. Stamp	
193 *102* HandFXtube Hand Finishing Cro	osstubes	Crosstubes Chemical Co		0.00									
195 *195* QC		QC7-Inspect Chemical (Conversion Coat	0.00	\ \	/							-

Quality Control

											DQA:	Da	te:	
NCR:	Yes	/ No				WORK ORDER NON-C	ONF	ORN	MANCE / UPDATE					
											QA Closed:	Da	te:	
Work Ord	or:					DISPOSITION	- 1		AGAINST I	DEI	PARTMENT	PROCESS		
Work Ord	ei. -					Rework	, I		Skid-tube Crosstube	\neg		Water Jet	\Box	Engineering
Part I	Nο					Scrap			Machining Small Fab	\dashv	Pro	d. Eng. Coor.	\vdash	Quality
i dici	-					Use-as-is	_T		noforming Finishing	ᅱ		e/Packaging	Н	Other
NCR I	No.					Work Order Update Large Fab Composite				_	,	Supplier		
	_				· · · · · · · · · · · · · · · · · · ·	· L	'		·					
Root			,		Descri	ption of work order update	Init	ial	Action		Sign &			
Cause		Date	Step	Qty	(or Non-conformance	Chief	Eng	Description		Date	Verificatio	n	QC Inspector
Doc/Data	Ш										•			
Equip/Tooling	Ц													
Operator	Ш								<i>y</i> *		i			
Material	Ш													
Setup	Ц													
Other	Ш													
Process	Ш													
Supplier	Ш]											
Training	Н													
Unapproved				l	<u> </u>		<u> </u>							
							AULT (CATE	GORY					
Landi	$\overline{}$					General			ı	_	1			<u>.</u> .
	\vdash	Bending	⁻				_	Ovalized		-	Pressure/Forced			
	-		ot Concer	ntric to	O/S	BOM/Route	Hardware			$\overline{}$	Over/Under			Temperature/Cure
	-	Cracks			<u> </u>	Broken/Damaged	Inspection Incomplete			_	Part Incorre		\vdash	Weld
	\vdash	Crushed/	Crimped.		<u> </u>	Burrs	Instructions Incomplete/Unclear ion Maintenance				Part Lost/Mi	ssing		Wrong Stock Pulled
	Cuffs			ļ	Contamination	\vdash		†	—	Part Moved				
I	Heat Treat Countersink Mislaheled				hal	i	Positioned V	Vrong						

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Power Loss/Surge

Other

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Cut Too Short

Drill Holes

Drawing

Finish

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Work Ord <i>July-13-12 12:3</i>	•	7326		*873	326*							Page	5
Item ID: Revision ID:	D212-664-1	101F		Accept	*N900	040	100)*	Setup		1 71	S1*	
Item Name:	Crosstube Fv	vd								Stop	*N:	S2*	
Required Date: 7/27/12 Req'd Qty:		Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:							
Reference: Approvals:	Process Pl	lan:	Date:	Tooling:	Da	nte:	_]	Run	Start	1/1	R1*	
	QC:		Date:	SPC (Y/N):	Da	ate:				Stop	*N	R2*	
Sequence ID/ Work Center II 200 *200*	D	Operation Description Spray Painting per QSI005 SprayPaint	4.2	Set Up/ Run Hours 0.00	Tool ID	Tool#	Plan Code	Accept Qty	Rej Qty		Reject Number	Insp. Stamp	
SprayPaint		Memo		0.00									
Spray Painting			and outside crosstube	as per QSI 005 4.2									
		2-Paint outside QSI 005 4.2 PRIME: Start Time: Fininsh Time: PAINT: Start Time: Finish Time:	_	D212-667-141 with Whit	e Imron as per								

0.00

0.00

QC14- Inspect Spray Paint

Memo

Then, Wrap in plastic bag to protect from scratches

210

Quality Control

										DQA:	Date:	
NCR:	res /	No			WORK ORDER NON-	COI	NFOR	MANCE / UPDAT	Έ			
										QA Closed:	Date:	
					DISPOSITION			Α	AGAINST DE	PARTMENT	/PROCESS	
Work Orde	er:				·	¬			\Box	1	\4/-A (-A	1 -
					Rework	-		⊢	rosstube		Water Jet	Engineering
Part N	No				Scrap	┥╵		~ ~	mall Fab		d. Eng. Coor.	Quality
NCD A	ıl a				Use-as-is Use-as-is	- '	inern	~ 	Finishing	Rec/Stol	re/Packaging Supplier	Other
NCR 1	NO	· · · · · · · · · · · · · · · · · · ·			Work Order Update			Large Fab Co	omposite		3upplier [ــا
Root		<u> </u>		Desc	ription of work order update	T	Initial	Action		Sign &		
Cause	Da	te Ste	p Qt	y	or Non-conformance	Ct	nief Eng	Descriptio	on	Date	Verification	QC Inspector
Doc/Data						T						
Equip/Tooling												
Operator												
Material												
Setup												
Other												
Process												
Supplier						İ		1				
Training												
Unapproved						\perp	18					<u> </u>
						:AUI	LT CATE	GORY				
Landi	ng Gear			_	General	_	-			,	_	-
	Bend	Bend Bend				L	Grain			Ovalized		Pressure/Forced
	Cent	re Not Co	ncentric	to O/S	BOM/Route	Hardware				Over/Under	tolerance	Temperature/Cure
	Crac			L	Broken/Damaged	en/Damaged Inspection Incomplete			<u> </u>	Part Incorre	ct	Weld
	Crus	Crushed/Crimped. Burrs				L	-i	tions Incomplete/Uncle	ear	Part Lost/M	issing	Wrong Stock Pulled
1	Cuffs	Cuffs			Contamination		Mainte	enance		Part Moved		

Mislabeled

Out of Calibration

Out of Sequence

Outside Dimensions

Misread

Offset

Positioned Wrong

Power Loss/Surge

Other

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

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Work Ord uly-13-12 12:		7326		*873	326*						Page 6	;
tem ID: Revision ID:	D212-664-	101F		Accept	*N900	040	100)* s	etup Star	ı Vı,	S1*	
tem Name:	Crosstube Fy	wd							Stop	' *N:	S2*	
tart Date:	7/20/12	Start Qty: 1.00	*1*		Cust Item I	D:						
Required Date	: 7/27/12	Req'd Qty: 1.00	*1*		Customer:							
Reference:							_		C4	4		
pprovals:	Process P	lan:	Date:	Tooling:	D:	ate:		К	un Star	" 7	R1*	
	QC:		Date:	SPC (Y/N):	D:	ate:			Stop	° *N	R2*	
equence ID/ Vork Center I	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp	
²⁰ *クク ハ *		Crosstubes	/,	0.00								
Crosstubes		Memo		0.00								
Crosstubes		1-Abrade ma clean the are	ating surfaces of support ea with 4105S wash 'n	rt and crosstube with 400 gri wipe	t sandpaper,							
			ports with Proseal 890 seal 890 Batch:	per OSI9563 and QSI 015								
		3- Torque bo	olts as per dwg									
30		QC6- Inspect dimensions	s to drawing	0.00								
230												
QC		Memo		0.00								
Quality Control				\	\ \	\wedge						
40		Pick Kit		0.00								
* 74 0*		Memo		0.00							<u> </u>	

Packaging

												DQA:	Date	e: _	
NCR:	Yes	/ No				WORK ORDER NON-	100	NFORM	MANCE / UP	DATE		-			
		•										QA Closed:	Date	e:	
March Ond						DISPOSITION				AGAINST	DE	PARTMENT/	PROCESS		
Work Ord	er: .					Rework	1	:	Skid-tube	Crosstube			Water Jet	\neg	Engineering
Part I	No.					Scrap	1 1		Machining	Small Fab		Dro	d. Eng. Coor.	\dashv	Quality
Parti	NO.					Use-as-is	1 1		noforming	Finishing			e/Packaging	\dashv	Other
NCR I	Nο					Work Order Update	1		Large Fab	Composite		1100	Supplier	\dashv	
, terri	10.					Work order opdate	ا ل		Edige (do	oomposite					LJ
Root					Descri	ption of work order update	П	nitial	Ac	tion		Sign &			
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Desc	ription		Date	Verification	١	QC Inspector
Doc/Data								-							
Equip/Tooling															
Operator															
Material															
Setup															
Other															
Process															
Supplier	Ш														
Training															
Unapproved							<u>l</u>								
							AUL	T CATE	GORY						
Landi		1			_	General	_	7			_	7			l
	⊢	Bending				Bend	lacksquare	Grain			_	Ovalized	1		Pressure/Forced
		Centre N	ot Concer	ntric to (o/s 📙	BOM/Route	\vdash	Hardwa				Over/Under	· · · · · · · · · · · · · · · · · · ·		Temperature/Cure
		Cracks				Broken/Damaged		Inspect	ion Incomplete			Part Incorred	ct		Weld
	1	Crushed/	Crimped.			Burrs		Instruct	ions Incomplete	/Unclear		Part Lost/Mi	issing		Wrong Stock Pulled

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Part Moved

Positioned Wrong

Power Loss/Surge

Other

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cuffs

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Orde		7326		*873	326*						Page 7
Revision ID:	D212-664-			Accept	*N900	040	100)* s	Setup Sta	I VI	S1* S2*
Start Date: Required Date: Reference:	7/20/12 7/27/12	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:					
Approvals:		lan:		Tooling: SPC (Y/N):		ate:		F	Run Sta Sto		R1* R2*
Sequence ID/ Work Center II 250 *250* QC Quality Control)	Operation Description QC4- 100% Inspect kits Memo	for completeness	Set Up/ Run Hours 0.00	Tool ID	Tool#	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
260 *260* Packaging Packaging		Packaging Memo Identify and	pack for shipping as per	0.00 0.00 PPP D212-664 101						_	. ———
270 . * 270* QC		QC21- Final Inspection -	Work Order Release	0.00			/		ハレナ	12/07	-120

Quality Control

W. 1.07.20

											DQA	.: Da	ate:	
NCR:	Yes	/ No				WORK ORDER NON-C	100	NFORM	ANCE / UP	DATE				
		÷									QA Closed	l: D	ate:	
Work Ord	er.					DISPOSITION				AGAINST DE	PARTMEN	T/PROCESS		
Work Ord						Rework			Skid-tube	Crosstube		Water Je	t	Engineering
Part I	No.					Scrap			Machining	Small Fab	Pr	od. Eng. Coor	. 🗖	Quality
						Use-as-is		Therm	noforming	Finishing	Rec/St	ore/Packaging	\Box	Other
NCR I	No.					Work Order Update]		Large Fab	Composite		Supplie	rШ	
Root			Ι		Descri	ption of work order update		nitial	Act	ion	Sign &			
Cause		Date	Step	Qty		or Non-conformance	1	ief Eng		ription	Date	Verification	วท	QC Inspector
Doc/Data	Г	Dute	Step	α.,		or rom comormance	-		200.	.p		10		
Equip/Tooling														
Operator									i					
Material														
Setup								٠						
Other			ļ											
Process														
Supplier														
Training			·											
Unapproved			l											
					·····		AUL	T CATE	GORY					
Landi	ng (7				General		1		_	7		_	1
	L	Bending			_	Bend	ldash	Grain		<u> </u>	Ovalized		<u> </u>	Pressure/Forced
	L	Centre No	ot Concei	ntric to	o/s	BOM/Route	\vdash	Hardwa			1	er tolerance	<u> </u>	Temperature/Cure
	\vdash	Cracks			<u> </u>	Broken/Damaged	<u> </u>	1 '	on Incomplete		Part Incor		<u> </u>	Weld
	\vdash	Crushed/	Crimped.		<u> </u>	Burrs	_	1	ions Incomplete/l	Jnclear	Part Lost/	-	<u> </u>	Wrong Stock Pulled
	L	Cuffs				Contamination	<u></u>	Mainte		<u></u>	Part Move			
		Heat Trea				Countersink	<u>_</u>	Mislabe			Positioned	_		7
	1	Inspectio	n Strip in	Tube	1	Cut Too Short	1	Misread	1		Power Los	s/Surge		Other

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

July-13-12 12:36:52 PM

Work Order ID:

87326

Parent Item:

D212-664-101F

Parent Item Name:

Crosstube Fwd

Start Date: 7/20/12

Required Date: 7/27/12

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:E04.02.16ReformatKJ/DS

IPP Rev:F 06-03-29

Remove Coments on Pick List JLM

IPP Rev:G 07-04-30 As per Rev C

JLM

IPP Rev:H 11.04.26 inspection

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location		Route on Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-101TRN		Manufactured	No			110	Each	4.0000	. 1	1			-
Crosstube Turning Detail													
c 200 ///	1			Location		Loc Oty	Lo	oc Code	Q	873	26	(X
D212-66	t-101			FG046		2							
	V (- 1				68584	0					_		
					35827	1					10		
					35828 35830	1 1					L		
				LG	33630	2							
					85829	1							
D3595-063-450		Manufactured	No		33027	230	Each	105.0895	4	4.21052	63		
RUBBER CUSHION		Manufactured	110			250	Euch	100.0075		4.21032			
		_		Location	•	Loc Qty	Lo	oc Code					
				LG		9.28							
					82511	9.28							
				LG051		85.7							
					80161	1.7			1				
					84715	84			1				
				MAT052		10.109474		1	<i>I</i> —	4			
					67353	. 2	/1		1 —				
					68893	6	//`					• • • •	•
					70113 71354	0.56	U	$\overline{}$	$\sqrt{}$	+-			
					71354 74113	0.2 0.349474			ι	J			
					7 4 113 75597	U.J47474		_	-				

NCR:	Yes	/	No

												DQA:	Date:	
NCR:	Yes	/ No				WORK ORDE	R NON-CO	INC	FORN	MANCE / UP	DATE	•		
												QA Closed:	Date:	
Mark Ord	or:					DISPOSI	TION				AGAINST D	EPARTMENT,	PROCESS	ļ
Vork Ord	er:						Rework	1		Skid-tube	Crosstube	7	Water Jet	Engineering
Part	No.						Scrap	1		Machining	Small Fab	Pro	d. Eng. Coor.	Quality
						l u	se-as-is			oforming	Finishing	_	e/Packaging	Other
NCR	No.					Work Order	⊢ —			Large Fab	Composite		Supplier	
									-					
Root						iption of work orde			itial		tion	Sign &	_	
Cause		Date	Step	Qty		or Non-conforman	ce	Chie	ef Eng	Desc	ription	Date	Verification	QC Inspector
oc/Data	_		:											
quip/Tooling	_		•											
perator	_						j							
laterial													:	
etup ther														
rocess	\vdash													
upplier	Г													
raining														
napproved														
12. 12. 12. 11		`					FA	ULT	CATE	GORY				
Land	ng (3			_	General	_				-		_	_
		Bending			L	Bend	1	0	Grain		L	Ovalized		Pressure/Forced
	<u> </u>	Centre No	ot Concer	ntric to	o/s	BOM/Route	.	_	lardwa	-	1	Over/Under	<u> </u>	Temperature/Cure
	 	Cracks			<u> </u>	Broken/Damaged		_	-	on Incomplete		Part Incorre	<u> </u>	Weld
	\vdash	Crushed/0	Crimped.			Burrs	-	_		ions Incomplete/	Unclear	Part Lost/M	ssing	Wrong Stock Pulled
	\vdash	Cuffs Heat Trea	•		-	Countersink	}		Mainte		}	Part Moved	Mrong	
	\vdash	Inspection		Tubo	-	Countersink Cut Too Short	}	\dashv	∕iislabe ∕iisread		}	Positioned V Power Loss/	-	Other
	_	Ripples in		iune	 	Drill Holes	-		viisread Offset		L	rower Loss/	Juige	Other
	一	Torque W		xtrusio	, F	Drawing	}	—-		Calibration				
	\vdash	Turning Se			·	Finish	ŀ			equence				
	Г	Wave/Tw	-			Folio	ļ	_		Dimensions		·		

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Work Order ID:	87326										
Parent Item:	D212-664-101F							Start I	Date: 7/20/12		Required Date: 7/27/12
Parent Item Name:	Crosstube Fwd							Start	Qty: 1.00		Required Qty: 1.00
MS21920-25 Clamp(per MIL-DTL-87	/83C)	Purchased	No			220	Each	136.0000	4	4	
- The second sec	,			Location	<u>.</u>	Loc Oty		Loc Code			
				LG050		11	7				
					116264		2				
					117998		4				
					118142		4				
					119339		2				
					119746		2				i
					120475		7			•	•
•					120920	4	6				
					122204	5	0				
				LG051		1	9				
					121583	1					
D2893-1		Manufactured	No			220	Each	16.0000	2	2	
2.75 Support		1,101101100000									
••				Location	1	Loc Qty		Loc Code			
				LG	•		9				
				LG	83056		9		-		
				1.0050	83030						
				LG052	50 06 5		7		 		
					72865		2				
		•			80271		4				
					82228		1				
D3428-1		Manufactured	No			240	Each	33.0000	1	1	
Placard				·							- SANCATO
				Location	<u>1</u>	Loc Qty		Loc Code			
				ST042		3	3				
				5.0	78933		2			-	٠.
					81881		9				
					83582	1					
					85228		2				

NCR:	Yes	/ No				WORK ORDER NON-C	100	NFORM	MANCE / UP	DATE			-
								,			QA Closed:	Dat	e:
						DISPOSITION				AGAINST D	EPARTMENT	/PROCESS	
Work Ord	er:					Rework	1		Skid-tube	Crosstube	٦	Water Jet	Engineering
Part i	No					Scrap	1		Machining	Small Fab	Pro	d. Eng. Coor.	Quality
Tare	10.					Use-as-is	1		noforming	Finishing		re/Packaging	Other
NCR I	Vo.					Work Order Update	1		Large Fab	Composite	1	Supplier	
						<u> </u>							
Root						ption of work order update	1	Initial		tion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling	<u> </u>												
Operator	\vdash												
Material	Ш		ļ				1						
Setup													
Other													
Process			1										
Supplier													
Training Unapproved													
Опаррточеи			L	1		F	AUI	T CATE	GORY		1	1	
Landi	ng (Gear				General							
		Bending				Bend		Grain			Ovalized		Pressure/Forced
		Centre N	ot Conce	ntric to	o/s	BOM/Route	Г	Hardwa	re ⁻		Over/Unde	r tolerance	Temperature/Cure
		Cracks				Broken/Damaged		Inspecti	ion Incomplete		Part Incorre	ect	Weld
		Crushed/	Crimped.			Burrs		Instruct	ions Incomplete/	Unclear	Part Lost/N	lissing	Wrong Stock Pulled
		Cuffs				Contamination		Mainte	enance		Part Moved		
		Heat Trea	at			Countersink		Mislabe	eled		Positioned	Wrong	
		Inspectio	n Strip in	Tube		Cut Too Short		Misread	t		Power Loss	/Surge	Other
		Ripples in	n Bend			Drill Holes		Offset					
		Torque W	Vaves in E	Extrusio	n [Drawing		Out of 0	Calibration				

Out of Sequence

Outside Dimensions

DQA:

Date:

Turning Sequence

Wave/Twist in Tube

Finish

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Picklist Print

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Page 3

Work Order ID: Parent Item: Parent Item Name:	87326 D212-664-101F Crosstube Fwd							Date: 7/20/12 Qty: 1.00		Required Date: 7/27/12 Required Qty: 1.00
AN6-35A BOLT		Purchased	No		240	Each	42.0000	4	4	
				Location	Loc Oty		Loc Code			
•				342	42					
•				121181	42					
N6-36A olt	·	Purchased	No		240	Each	47.0000	4	4	
				Location	Loc Qty		Loc Code	•		
				ST342	47					•
				118422	2					
				119449	1					
				120187	4					
				120423	40					
IS21042L6 ut		Purchased	No		240	Each	479.0000	6	6	
				Location	Loc Qty		Loc Code			
				ST300	479					
				117677	25					
				118384	3					
				118927	48					
				119075	203					
				120308	200					
N960JD616 Vasher	NAS1149D0663J	Purchased	No		240	Each	0.0000	18	18	

) ·

											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-	O	VFORM	MANCE / UP	DATE			
								i			QA Closed:	Date:	
Work Ord	or.					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part NCR	No.	*				Rework Scrap Use-as-is Work Order Update		Thern	Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite	4	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other
Root					Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Desc	cription	Date	Verification	QC Inspector
Doc/Data	L												
Equip/Tooling													
Operator													
Material									ĺ				
Setup													
Other													
Process							İ						
Supplier													
Training]											
Unapproved													
							AUI	LT CATE	GORY				
Land	ing (Gear				General		-			_		-
		Bending				Bend	L	Grain			Ovalized		Pressure/Forced
	L	Centre No	ot Concei	ntric to	o/s	BOM/Route	L	Hardwa	ire		Over/Under	tolerance	Temperature/Cure
		Cracks				Broken/Damaged		Inspect	ion Incomplete		Part Incorre	ct	Weld
		Crushed/	Crimped.			Burrs		Instruct	tions Incomplete/	/Unclear	Part Lost/M	issing	Wrong Stock Pulled
		Cuffs				Contamination		Mainte	enance		Part Moved		_
ł		Heat Trea	at			Countersink		Mislabe	eled		Positioned \	Wrong	
		Inspectio	n Strip in	Tube		Cut Too Short		Misread	d		Power Loss,	/Surge	Other

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

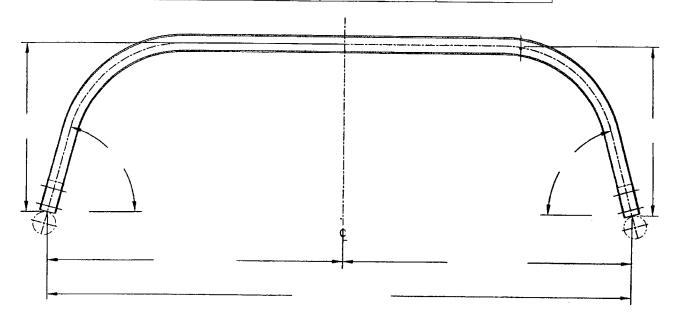
Drawing

Finish

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DART AEROSPACE LTD	Work Order:	87326
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: D		Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7
Bending Passes	3	
Crushing		6%



	Side A	Side B
Bending Passes		
Bending Passes Crushing		
	Comments	

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
Α	07.02.06	New Issue	KJ/JM	
В	03.04.21	Dwg Rev updated	KJ/JM	
С	10.04.01	Dwg Rev updated	KJ N	
D	12.04.16	Added bending, crushing dimensions	KJ 🖎	W

Item	Qty -141	Qty -141B	Part Number	Description
1	х		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2	ļ'	х	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

D

В

1) MATERIAL: MANUFACTURED FROM D6005-128

FINISHED LENGTH = 126.514±0.020

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART QSI 005 4.2

3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

4) UNITS: INCHES UNLESS OTHERWISE NOTED.

5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.

IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS

WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664) D212-664-141B = 33.6 lbs (PER IIN-D212-664)

8) PART IS SYMMETRIC ABOUT CENTERLINE.

9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.

10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.

11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING

13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE.

14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY **RETURN TO ENGINEERING** UNCONTROLLED COPY SUBJECT TO AMENDMENT WITHOUT NOTICE

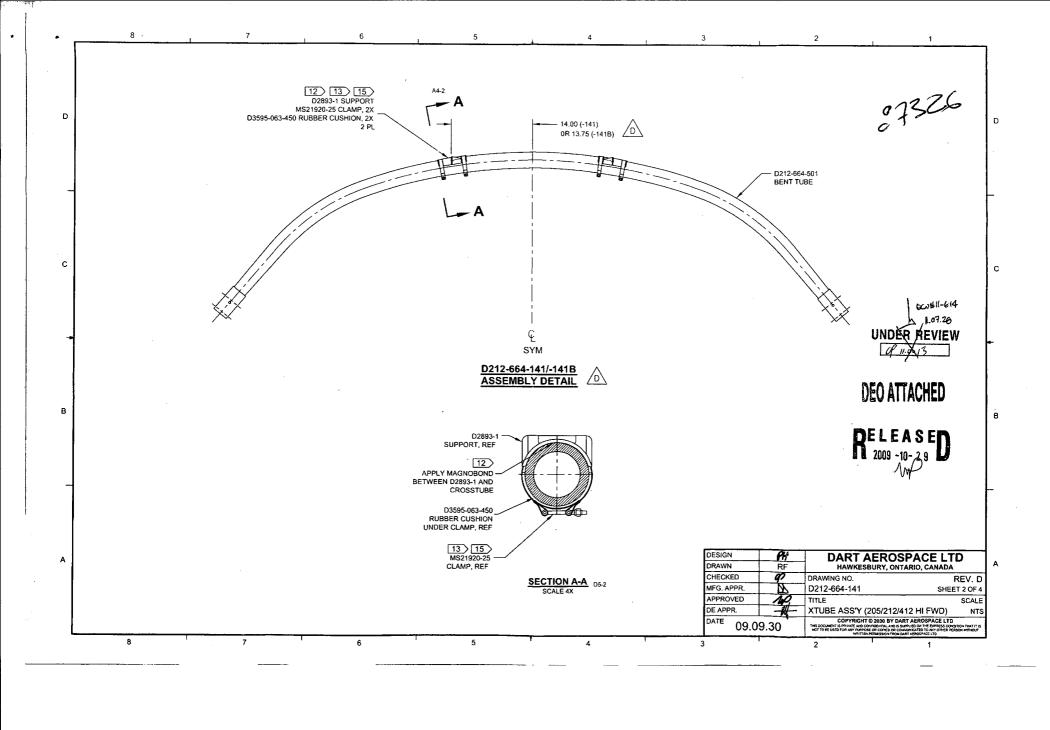
12/07/16

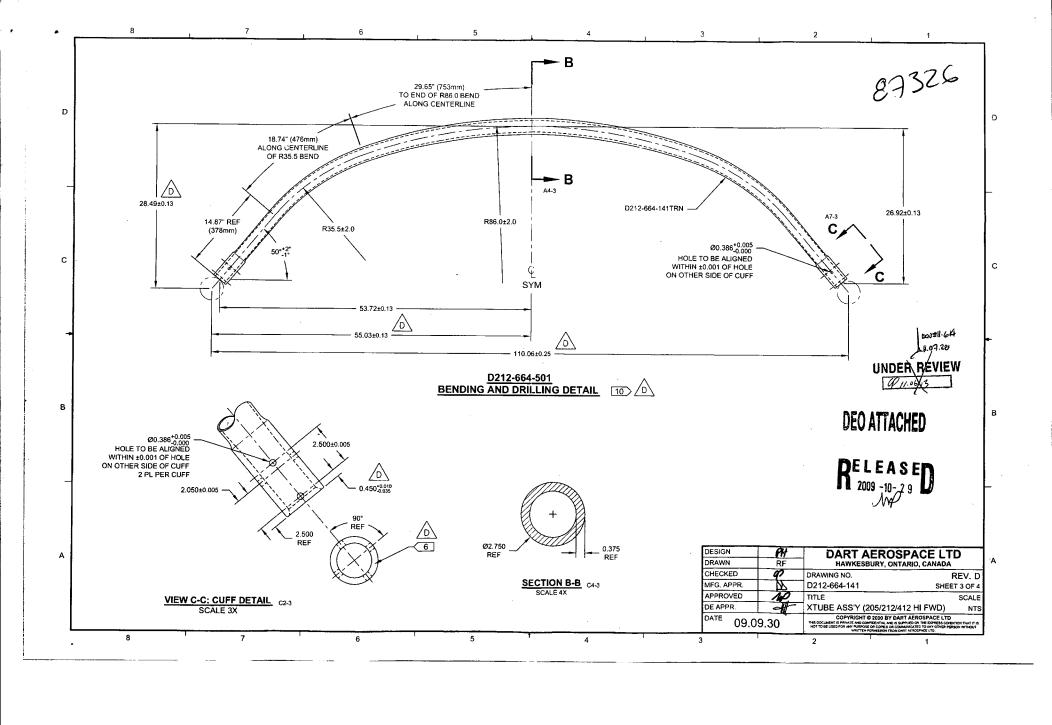
REMOVED FROM UNDER REVIEW PER UNDER BEVIEW SCN #11-64

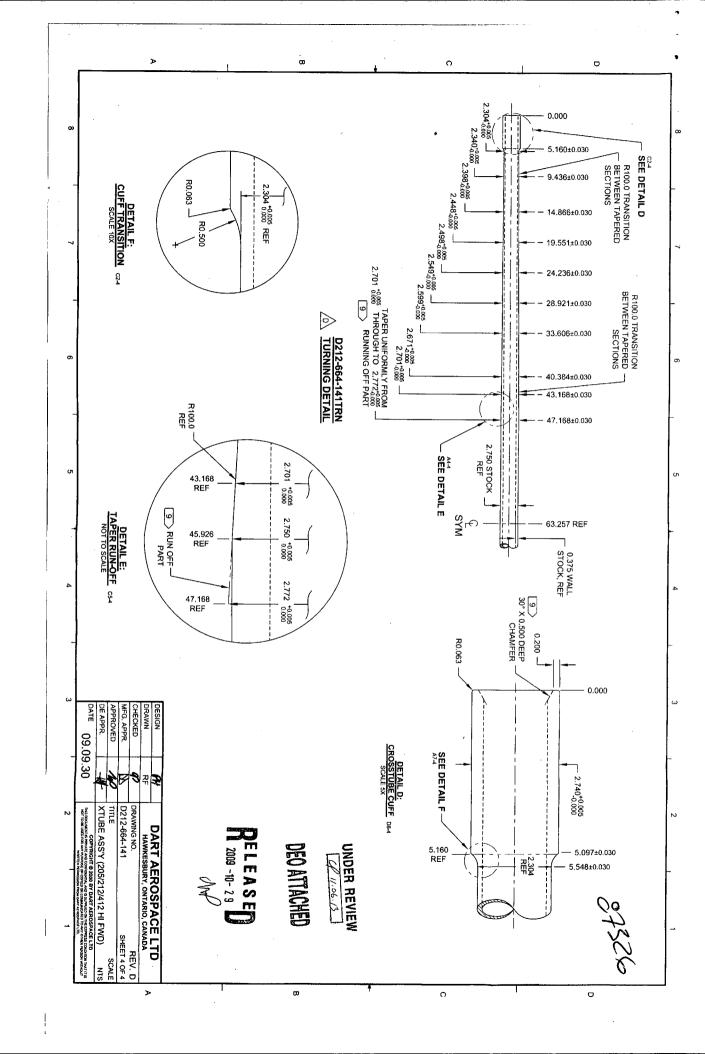
DEO ATTACHED

8

D	REORG TO CUP REMOV & B6-3):	FORMAT/REVISE GENERAL NOTES/PART LIST; ORGANIZED VIEWS AND REFORMATTED DRAWING OURRENT STANDARDS; ADD -1418 (ZN B4-2, D4-2); MOVED REF & ADD TOLERANCES (ZN B4-3, C8-3, C8-3); SED TURNING DETAIL & UPDATED TOLERANCE TO IEET 4					
С			SION STRIP; ADD MAGNOBOND ÆRSE CLAMPS	PH	07.03.08		
В.	ADD HOLES FOR COMPATABILITY WITH BHT/AA PH 05.02.04						
Α	NEW IS	NEW ISSUE PH 00.12.12					
REV.			BY	DATE			
DESIGN		PH	DART AEROSP	ACF	ITD		
DRAWN		RF	HAWKESBURY, ONTARI				
CHECKE	D	q)	DRAWING NO.		REV. D		
MFG. AF	PR.	<i>N</i>	D212-664-141	s	HEET 1 OF 4		
APPRO\	/ED	10	ITLE SCA				
DE APP	DE APPR. XTUBE ASS'Y			HI FW	D) NTS		
DATE 09.09.30			COPYRIGHT © 2000 BY DART AI THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED NOT TO BE USED FOR ANY PURPOSE OR CORPED OR COMMUNIC WRITTEN PERMISSION FROM DART AF	ON THE EXPRE	SECONDITION THAT IT IS		







DRAWING NO.	TITLE	REV. D	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D212-664-141	XTUBE ASSY (205/212/4	12 HI FWD)	ENGINEERING ORDER	D212-664-141-D-1	SHEET 1 OF 2	NTS
DRAWN	CHECKED	P	MFG. APPR. E	APPROVED NA	DE APPR.	
DATE 11.04	1.07 DATE	11, 47, 11	DATE ((.04.(2	DATE 11/04/12	DATE 11.04.12	-

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND

PAINT OUTSIDE PER DART QSI 005 4.2

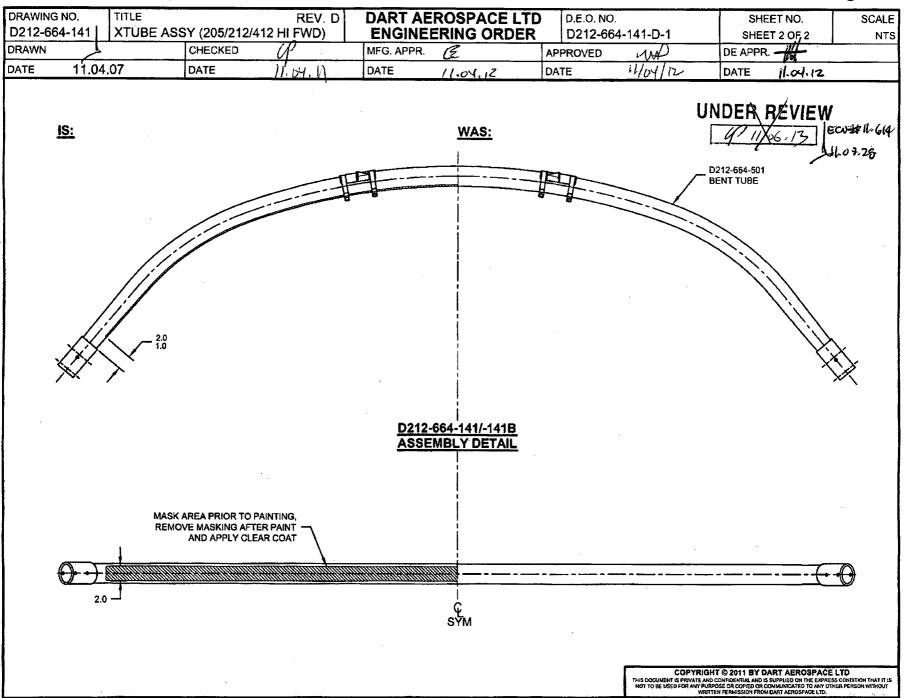
REMOVE MASKING AND APPLY CLEAR COAT

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART QSI 005 4.2



DRAWING NO.	TITLE REV. D	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D212-664-141	CROSSTUBE ASS'Y (205 HI FWD)	ENGINEERING ORDER	D212-664-141-D-2	SHEET 1 OF 1	NTS
DRAWN //	CHECKED A>S	MFG. APPR	APPROVED 14	DE APPR.	
DATE 11.07	15 DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21	

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

ltem	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023
				ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,
				TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



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